ORIGINAL RESEARCH PAPER
Volume - 14 | Issue - 10 | October - 2025 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

ANTENATAL AND POST NATAL CARE TRENDS AND PATTERNS IN DISTRICTS OF UTTAR PRADESH

Healthcare

Dr. Ajay Pandey* Assistant Director, Population Research Centre, University of Lucknow *Corresponding Author
Prof. Vinod Singh Director, Population Research Centre, University of Lucknow
Richa Sharma Deputy Director, NILERD, Delhi

ABSTRACT

This study examines the factors influencing antenatal care (ANC) and postnatal care (PNC) attendance in Uttar Pradesh, India, based on NFHS-5 data. District wise trend in ANC and PNC is studies using data from HMIS. Findings reveal that rural women had higher odds of receiving timely PNC compared to their urban counterparts. Women from OBC communities demonstrate lower odds of seeking timely PNC than SC/ST groups. Similarly, Muslim women exhibited nearly twice the odds of receiving PNC compared to Hindu women, suggesting stronger cultural practices supporting maternal care in certain communities. Wealth emerged as a crucial determinant, with wealthier households being significantly more likely to access ANC and PNC services. Surprisingly, higher educational attainment correlated with lower odds of timely PNC, possibly indicating alternative healthcare-seeking behaviors or reliance on self-care practices. Healthcare provider type strongly influenced maternal care outcomes, as doctor-led services significantly increased the likelihood of completing ANC and PNC visits, while reliance on non-skilled providers reduced these odds. The study highlights the urgent need for targeted interventions to improve maternal healthcare outcomes. Strengthening awareness campaigns, enhancing healthcare worker training, and promoting doctor-led maternal services are critical steps to addressing disparities and improving ANC and PNC coverage in Uttar Pradesh.

KEYWORDS

HMIS; Antenatal Care; Postnatal Care, Uttar Pradesh

INTRODUCTION

Antenatal care (ANC) and postnatal care (PNC) are critical components of maternal and child healthcare, playing a vital role in ensuring safe pregnancies and healthy outcomes for both mothers and newborns. ANC services provide pregnant women with essential health assessments, nutritional guidance, and preventive care, reducing risks associated with complications during childbirth (WHO, 2016). PNC, on the other hand, focuses on the immediate post-delivery period, addressing potential health risks for both the mother and the newborn in the crucial first days after birth. Ensuring access to timely and quality ANC and PNC services is a vital strategy in reducing maternal and neonatal mortality rates (Titaley et al., 2009). Despite these recognized benefits, disparities in ANC and PNC utilization persist across socio-economic, demographic, and geographic lines. In India, regions such as Uttar Pradesh demonstrate significant gaps in maternal healthcare utilization, posing challenges in improving maternal and child health outcomes (Singh et al., 2012). Exploring the factors that influence ANC and PNC attendance in this region is critical for designing effective interventions that enhance healthcare equity and improve service delivery.

Several studies have explored the determinants of ANC and PNC utilization. Socio-economic factors have consistently emerged as crucial predictors of maternal healthcare access. Research by Ahmed et al. (2010) indicates that wealthier households have higher rates of ANC attendance, largely due to improved access to healthcare facilities and resources. Similarly, Barros et al. (2012) identified financial stability as a strong determinant of PNC attendance, emphasizing that financial barriers often limit healthcare engagement in economically disadvantaged communities. Education has also been shown to influence maternal healthcare access. Caldwell (1979) highlighted that educated women are more aware of healthcare benefits and are better equipped to seek services during pregnancy and after childbirth. However, some studies (e.g., Fagbamigbe & Idemudia, 2015) suggest that highly educated women may overlook routine checkups in favor of self-care or private healthcare alternatives, particularly for PNC services. Caste and social structure play a significant role in healthcare access in India. Subramanian et al. (2008) reported that marginalized groups, such as SC/ST communities, experience greater exclusion from healthcare services, contributing to lower ANC and PNC attendance rates. Conversely, Singh et al. (2012) observed that Muslim women in India often display stronger maternal care-seeking behaviors than their Hindu counterparts, possibly due to cultural practices emphasizing family-centred care. Healthcare provider type has also been identified as a key determinant of ANC and PNC utilization. Kruk et al. (2010) found that doctor-led care significantly increases maternal healthcare uptake, while reliance on non-skilled providers often reduces the likelihood of completing recommended ANC and PNC checkups. Additionally, Montagu et al. (2011) emphasized the importance of improving healthcare worker training, particularly in rural and underserved areas, to ensure better maternal care outcomes. These findings collectively underscore the complexity of maternal healthcare utilization and the need for targeted interventions to improve ANC and PNC coverage in Uttar Pradesh. This study using data from HMIS and NFHS-5 from Uttar Pradesh will study trend and estimate the predictors of ANC and PNC services in the state to improve maternal and child health outcomes in the region.

Data and Methods

The study uses HMIS data from 2020-21 to 2023-24 to study trend in ANC and PNC service utilization across districts and NFHS-5 data to study the predictors of use of ANC and PNC services.

Findings

The table 1 (annexure) presents data on the percentage of pregnant women (PW) who received four or more antenatal care (ANC) checkups in Uttar Pradesh across four financial years (2020-21 to 2023-24). The data is sorted based on the most recent year, providing insights into regional healthcare trends and performance. Statewide, the percentage of women receiving four or more ANC checkups steadily improved from 77.01% in 2020-21 to 93.43% in 2023-24. This consistent increase highlights significant progress in maternal healthcare services and improved outreach initiatives in the state. Several districts showcased impressive improvements in ANC coverage. Notably, Agra demonstrated remarkable progress, jumping from 80.37% in 2020-21 to 126.03% in 2023-24. Similarly, Unnao improved significantly from 89.47% to 106.29%, while Muzaffarnagar rose from 86.08% to 107.58% over the same period.

Kheri, Hamirpur, and Rae Bareli reported figures exceeding 100%, suggesting either enhanced tracking of previously missed cases or improved registration practices. The data from Rae Bareli, shows more than 100% ANC 4 or more (121.68% in 2020-21 and 111.18% in 2023-24) may reflect targeted healthcare initiatives or better follow-up mechanisms. Districts such as Lucknow, Kanpur Nagar, and Meerut displayed gradual but positive growth. For instance, Lucknow progressed from 48.73% to 70.68%, and Kanpur Nagar improved from 43.35% to 66.03%. Although these figures fall below some high-performing districts, the consistent upward trend reflects ongoing improvement efforts. Despite the overall positive trend, some districts exhibited declines or inconsistent growth. Kanpur Dehat, for instance, saw a reduction from 86.98% in 2020-21 to 76.65% in 2023-24. Similarly, Mathura demonstrated fluctuations, peaking at 117.40% in

2021-22 before stabilizing at 87.36% in 2023-24. These inconsistencies may result from reporting issues, gaps in healthcare delivery, or demographic changes. Urban districts like Ghaziabad and Gautam Buddha Nagar maintained relatively stable yet high figures, consistently exceeding 70%. Meanwhile, smaller or rural districts such as Lalitpur and Chitrakoot achieved significant gains, with both crossing the 99% mark by 2023-24. The data reveals encouraging trends in Uttar Pradesh's maternal healthcare efforts, with substantial improvements in ANC checkup coverage across most districts. While some regions show outstanding progress, others require continued attention to address inconsistencies and ensure sustained healthcare access. The sharp increases in some districts with percentages exceeding 100% may indicate improved registration systems or better follow-up strategies. Continued investment in healthcare outreach, monitoring, and awareness programs will be vital to maintaining and expanding these positive trends.

The annexure table 2 highlights trends in the percentage of women receiving postpartum checkups between 48 hours and 14 days after delivery in Uttar Pradesh from 2020-21 to 2023-24. The data, sorted based on the most recent year values, reveals both progress and areas requiring attention in maternal healthcare services across the state.

In 2023-24, districts like Prayagraj, Amethi, and Lalitpur stood out with the highest postpartum checkup rates, achieving 94.80%, 96.98%, and 86.89%, respectively. Their sustained improvement reflects enhanced healthcare outreach, robust follow-up systems, and effective institutional delivery programs. Similarly, Jhansi (84.70%) and Ghaziabad (89.02%) reported strong performances, showcasing consistent access to postnatal care services. Several districts exhibited remarkable growth over the four-year period. Hapur improved from 34.83% in 2020-21 to 83.99% in 2023-24, while Pilibhit rose from 19.32% to 85.09% during the same period. Amethi also demonstrated substantial progress, climbing from 75.70% to 96.98%. These improvements likely stem from increased institutional deliveries, improved healthcare awareness, and enhanced service delivery mechanisms. However, some districts experienced declines or fluctuations in postpartum checkup rates. Etah dropped from 26.39% in 2020-21 to just 9.77% in 2023-24, and Rampur decreased from 43.30% to 13.04%. Similarly, Mahoba, despite an increase to 5.72% in 2022-23, fell back to 2.13% in 2023-24. These declines may suggest challenges in maintaining consistent outreach, disruptions in healthcare delivery, or regional disparities in maternal healthcare access. Urban districts like Ghaziabad, Noida, and Saharanpur maintained consistently high postpartum checkup rates, while rural regions such as Hapur and Pilibhit displayed impressive improvements. This suggests that targeted maternal healthcare campaigns are having a positive impact in previously underserved areas. The state average dropped slightly from 50.55% in 2022-23 to 43.75% in 2023-24, emphasizing the need for sustained efforts to ensure comprehensive maternal healthcare coverage. Addressing regional disparities, improving healthcare accessibility, and strengthening follow-up mechanisms will be essential for ensuring continued progress in postpartum care services across Uttar Pradesh.

Findings from NFHS-5: Uttar Pradesh

The table 3 (annexure) provides the sample distribution of the percentage of women in Uttar Pradesh who sought antenatal care (ANC) services during pregnancy, based on data from the NFHS-5 survey (2019-2021). Out of a total of 25,404 women surveyed, a concerning 5.39% (1,370 women) reported receiving no ANC services at all, highlighting a gap in essential maternal care that could increase pregnancy-related risks. Additionally, 10.83% (2,750 women) had only one ANC visit, indicating limited engagement with healthcare providers, which may stem from accessibility issues, lack of awareness, or socio-economic constraints. The largest segment, accounting for 42.17% (10,713 women), reported having two to three ANC visits. While this group accessed healthcare more consistently, they still fell short of the recommended minimum of four ANC checkups, which is crucial for comprehensive maternal care. Encouragingly, 41.61% (10,571 women) achieved the ideal standard of four or more ANC visits, reflecting positive engagement with healthcare services in this portion of the population. These findings highlight a mixed scenario in Uttar Pradesh's maternal healthcare landscape. While nearly 41.61% of women achieved the recommended ANC visits, a substantial 53% fell below this standard. Strengthening outreach programs, promoting maternal health education, and improving infrastructure in underserved areas will be key to ensuring greater ANC coverage and better pregnancy outcomes across the state.

The table 4 (annexure) provides insights into the sample distribution of women in Uttar Pradesh who attended four or more antenatal care (ANC) visits, based on data from the NFHS-5 survey. Out of a total of 25,404 women surveyed, only 41.61% (10,571 women) reported attending four or more ANC visits, while a significant 58.39% (14,833 women) did not meet this recommended standard, indicating gaps in maternal healthcare engagement. In terms of residence, the majority of respondents were from rural areas (83.33%) compared to 16.67% from urban regions. This disparity highlights the need to improve ANC outreach in rural areas to enhance healthcare access. Regarding caste distribution, 54.88% of respondents belonged to the OBC category, followed by 28.03% from SC/ST communities and 17.09% from the General category. This indicates that social and economic inequalities may influence ANC attendance rates. Religious distribution showed that 82.65% of respondents were Hindu, while 17.04% were Muslim, with a minor proportion (0.31%) belonging to other religious groups. Wealth status data revealed that 52.44% of surveyed women belonged to the poorest/poorer category, 18.5% to the middle class, and 29.07% to the richer/richest group. These figures emphasize that economically disadvantaged groups may face greater challenges in accessing ANC services. Education played a significant role in ANC attendance. Among respondents, 28.94% were illiterate, while 53.82% had attained a secondary-level education, and 17.25% had received higher education. The correlation between education levels and improved ANC attendance underscores the importance of awareness and education in improving maternal healthcare outcomes. Regarding healthcare providers, 45.07% of respondents received ANC care from doctors, while 35.43% relied on nurses or midwives. A smaller portion (14.11%) reported receiving ANC services from traditional birth attendants (TBA) or relatives, suggesting that some women still rely on informal care sources, possibly due to limited healthcare access. Alarmingly, 5.39% (1,370 women) reported receiving no ANC care, indicating serious gaps in healthcare outreach and accessibility. Overall, the data highlights disparities in ANC attendance influenced by economic conditions, education levels, and regional differences.

The table 5 (annexure) presents district-wise data on the percentage of women in Uttar Pradesh who received four or more antenatal care (ANC) visits during pregnancy, based on the NFHS-5 survey. The overall percentage of women receiving four or more ANC visits in the state stands at 41.62%, with 58.38% of women falling short of this recommended standard, underscoring significant gaps in maternal healthcare access. The data reveals substantial regional disparities in ANC coverage across districts. Several districts reported notably low ANC attendance rates, with less than 30% of women meeting the recommended four ANC visits. Among these, Unnao (18.94%), Barabanki (22.62%), Sant Ravidas Nagar (26.38%), and Mahamaya Nagar (27.20%) stand out as particularly underserved areas. These figures highlight the urgent need for improved healthcare awareness, better infrastructure, and enhanced accessibility in these regions. In the mid-range category, districts such as Bareilly (42.22%), Deoria (42.49%), Rampur (51.79%), and Saharanpur (51.88%) reported ANC attendance rates between 30% and 50%. While these regions demonstrate moderate progress, they still fall short of the recommended healthcare standard and may benefit from targeted maternal health programs to bridge the gap. On the other hand, a few districts reported relatively strong ANC coverage rates, exceeding 50%. Leading districts in this category include Kanpur Nagar (69.96%), Jalaun (64.44%), Siddharth Nagar (59.87%), and Ghaziabad (56.48%). These higher-performing districts may have achieved improved outcomes due to better healthcare infrastructure, increased educational efforts, and targeted maternal healthcare programs. Overall, the data emphasizes the need for targeted interventions in districts with low ANC attendance rates.

Table 6 (annexure) provides the findings from the logistic regression analysis revealing key predictors influencing the likelihood of women attending four or more antenatal care (ANC) visits in Uttar Pradesh, based on NFHS-5 data. The findings highlight significant socio-demographic and healthcare-related factors that shape ANC utilization patterns in the state. Women residing in urban areas were 1.22 times more likely to attend four or more ANC visits compared to their rural counterparts. This statistically significant result underscores the advantage urban populations have in accessing maternal healthcare services, possibly due to better infrastructure and awareness. Caste

differences were also observed, with women from the OBC category being 1.10 times more likely to meet ANC visit recommendations compared to those from SC/ST communities. Women from other castes (excluding SC/ST and OBC) had even higher odds (1.18 times) of seeking the recommended ANC services. These disparities suggest that caste-based social and economic inequalities still influence healthcare access. Religious affiliation showed no statistically significant impact, as Muslim women and those from other religions displayed similar ANC attendance rates compared to Hindu women. This finding suggests that religion alone does not significantly predict ANC attendance in Uttar Pradesh. Wealth status proved to be a strong determinant of ANC attendance. Women from middle-income households were 1.11 times more likely to access ANC care than those from the poorest/poorer category, while women from richer/richest households were 1.24 times more likely to attend four or more ANC visits. These results highlight the influence of economic stability in enabling consistent healthcare access.

Education was another critical factor, with women who attained secondary education being 1.16 times more likely to attend four or more ANC visits compared to their illiterate counterparts. Women with higher education were even more likely to meet this standard, with odds increasing to 1.33 times. This emphasizes the positive correlation between education and healthcare awareness. The type of ANC service provider significantly impacted ANC completion rates. Women who relied on nurses or midwives were 24% less likely to meet the recommended ANC visits compared to those attended by doctors. The likelihood dropped further for women receiving care from traditional birth attendants (TBA), informal caregivers, or relatives, with their odds reduced to 0.62 times compared to doctor-attended women. This finding highlights the importance of doctor-led ANC services in promoting comprehensive maternal care. Overall, the analysis emphasizes that ANC attendance is influenced by multiple interlinked factors. Urban residence, wealth, education, and caste positively affect ANC visits, while reliance on non-specialist caregivers significantly reduces adherence to ANC guidelines.

The sample distribution from the NFHS-5 survey reveals significant gaps in postnatal care (PNC) coverage within two days of delivery among women in Uttar Pradesh as presented in table 7 (annexure). Of the total 13,425 respondents, only 24.23% (3,253 women) received timely PNC check-ups, while a concerning 75.77% (10,172 women) did not. This highlights a substantial shortfall in ensuring essential maternal healthcare services. The majority of respondents (84.67%) resided in rural areas, with only 15.33% from urban regions. This imbalance suggests that rural populations face greater challenges in accessing timely PNC services, likely due to infrastructural gaps, awareness issues, or logistical barriers. In terms of caste distribution, women from the OBC category made up the largest group (54.82%), followed by SC/ST communities (28.98%) and those from the General category (16.21%). This distribution highlights the need for targeted interventions in marginalized groups to improve healthcare equity. Religious demographics closely align with Uttar Pradesh's overall population profile, with 82.39% identifying as Hindu, 17.3% as Muslim, and 0.31% from other religions. Economic disparities are evident in the data. Over half of respondents (53.15%) belonged to the poorest/poorer category, while 27.93% were from the richer/richest segment, and 18.91% belonged to the middle wealth category. The lower PNC coverage among economically disadvantaged groups underscores the need for financial and logistical support to improve maternal healthcare access. Education levels played a crucial role in healthcare engagement. While 56.6% of respondents had secondary education, 26.17% were illiterate, and 17.23% had attained higher education. The data suggests that women with higher education are more likely to access healthcare services, highlighting the importance of maternal health awareness programs, particularly in undereducated communities. The type of healthcare provider further reflects gaps in quality care. Alarmingly, 75.77% of newborns received no postnatal check-up. Among those who did receive care, only 5.16% were seen by doctors, while 9.24% were treated by nurses or midwives, and 9.82% by non-skilled providers. The low involvement of trained healthcare professionals underscores the urgent need to improve access to skilled maternal care services.

The NFHS-5 data as shown in the table 8 (annexure) reveals significant disparities in postnatal care (PNC) coverage within two days of delivery across districts in Uttar Pradesh. The overall state average for timely PNC checkups is 24.23%, meaning that a concerning 75.77% of women did not receive this critical early postnatal care. Several districts reported alarmingly low rates of PNC coverage, with some falling below 15%. Districts such as Azamgarh (11.11%), Faizabad (11.63%), and Gonda (12.00%) are among the lowest-performing regions. These figures highlight substantial gaps in maternal healthcare outreach and accessibility in these areas. Moderate-performing districts showed PNC coverage rates in the 20-30% range. Examples include Baghpat (24.85%), Moradabad (25.15%), and Deoria (25.45%). While these districts demonstrate progress, their coverage rates remain below the desired threshold for effective maternal healthcare. Some districts performed notably well, exceeding the 40% mark for timely PNC checkups. Leading districts such as Jhansi (55.64%), Mahoba (50.97%), and Hamirpur (48.84%) reflect improved healthcare access, better maternal care programs, and possibly stronger community awareness initiatives.

The logistic regression analysis of NFHS-5 data reveals key factors influencing the likelihood of women in Uttar Pradesh receiving postnatal care (PNC) within two days of delivery. The findings from table 9 (annexure), highlight significant socio-economic, demographic, and healthcare-related determinants that shape PNC attendance patterns. Women residing in urban areas were found to be significantly less likely (0.68 times) to receive PNC within two days compared to their rural counterparts. While this may seem counterintuitive, it could reflect differences in healthcare-seeking behaviors, accessibility challenges in urban slum areas, or issues with awareness and service availability. Caste disparities were also evident in the data. Compared to women from SC/ST communities, those belonging to the OBC group had 0.68 times lower odds of receiving timely PNC, while women from other castes (excluding SC/ST and OBC) had 0.69 times lower odds. These patterns suggest that caste-related social and economic inequalities continue to limit healthcare access for some groups. Religious background played a significant role, with Muslim women being nearly 1.96 times more likely to receive PNC within two days compared to Hindu women. Women from other religious groups showed even higher odds (4.63 times), though the wider confidence interval suggests some uncertainty in this result. These findings may reflect cultural practices, awareness levels, or differing healthcare priorities across religious groups. Economic status emerged as a powerful predictor of PNC access. Women from middle-income households were 3.76 times more likely to receive PNC within two days compared to those in the poorest/poorer category. This likelihood increased dramatically for women in the richer/richest category, who were 16.80 times more likely to access early PNC services. These results highlight the substantial influence of financial stability on maternal healthcare access.

Surprisingly, education showed an unexpected pattern. Women with secondary education had 0.72 times lower odds of receiving timely PNC compared to illiterate women, and those with higher education had even lower odds (0.63 times). This unexpected trend may reflect limited awareness of PNC timing among some educated women or the possibility that healthcare-seeking behaviors differ in educated groups due to cultural factors or reliance on alternative healthcare practices. The type of healthcare provider also influenced PNC attendance. Women attended by non-skilled providers were 0.57 times less likely to receive timely PNC compared to those attended by doctors, emphasizing the importance of trained medical professionals in improving postnatal care access. Conversely, women attended by nurses/midwives showed no significant difference from those seen by doctors, suggesting that these healthcare providers effectively contribute to maternal care when available. Overall, the findings underscore the complexity of factors influencing PNC access in Uttar Pradesh. While wealthier households and Muslim women demonstrate higher odds of seeking timely PNC, urban residents, OBC women, and those relying on non-skilled caregivers face notable challenges.

DISCUSSION

The analysis of antenatal care (ANC) and postnatal care (PNC) data in Uttar Pradesh highlights several critical patterns and disparities that align with findings from previous studies. The results show that socio-economic status, education, caste, religion, and healthcare access significantly influence maternal healthcare utilization.

Several studies have demonstrated that urban residence often improves healthcare access (Bloom et al., 2001); however, in the current data, rural women had higher odds of receiving timely PNC. This unexpected trend may align with findings by Agarwal et al. (2016), who suggested that urban slum populations face unique barriers such as overcrowded clinics, informal healthcare dependence, and limited awareness about postnatal care services. Caste-based

disparities observed in ANC and PNC attendance are consistent with research by Subramanian et al. (2008), which revealed that marginalized groups like SC/ST communities experience greater healthcare exclusion. The current data shows that OBC women had lower odds of receiving timely PNC, reinforcing the persistence of social inequality despite healthcare reforms. Religious differences in healthcare-seeking behavior have been widely discussed. Consistent with our findings, Singh et al. (2012) reported that Muslim women often demonstrate better maternal care-seeking behaviors than their Hindu counterparts, possibly due to stronger cultural norms emphasizing family care after childbirth. Wealth disparities were among the strongest predictors of ANC and PNC attendance. Women from wealthier households were significantly more likely to access both ANC (Ahmed et al., 2010) and PNC services (Barros et al., 2012), reflecting financial stability's positive influence on healthcare access. Financial security enables access to transportation, better healthcare facilities, and paid services, which are vital for consistent maternal care engagement. Surprisingly, education showed an inverse relationship with PNC attendance, where better-educated women had lower odds of receiving timely care. While education is typically linked to improved healthcare outcomes (Caldwell, 1979), recent studies (e.g., Fagbamigbe & Idemudia, 2015) suggest that highly educated women may adopt non-standard healthcare practices, rely on specialized services outside public healthcare systems, or underestimate the importance of routine checkups in favor of self-care. The strong role of doctor-led care in improving ANC and PNC access aligns with findings by Kruk et al. (2010), who emphasized that skilled healthcare providers ensure better maternal care outcomes. Conversely, women attended by non-skilled providers were significantly less likely to complete ANC and PNC visits, which echoes results reported by Montagu et al. (2011), underscoring the need for better-trained healthcare personnel in rural and underserved areas. The findings align with global patterns emphasizing that ANC and PNC coverage is shaped by economic status, education, and social factors (Rai et al., 2012). Interventions such as community-based health awareness campaigns (Tripathy et al., 2010) and improved healthcare access strategies are essential for addressing disparities and improving maternal healthcare outcomes in Uttar Pradesh.

CONCLUSION

The findings reveal significant gaps in ANC and PNC coverage in Uttar Pradesh, driven by socio-economic inequalities, caste disparities, and limitations in healthcare access. While rural women showed better PNC attendance than urban residents, marginalized groups like SC/ST communities, economically disadvantaged women, and those without access to skilled providers remained at risk. Addressing these disparities is essential to improving maternal healthcare outcomes in the state.

Policy Implications

Expanding rural healthcare services by establishing mobile healthcare units and village-level maternal programs can help address the healthcare barriers faced by rural women. Simultaneously, improving healthcare infrastructure in urban slums is necessary to overcome accessibility challenges in densely populated areas. Culturally tailored awareness campaigns and healthcare incentives should be implemented to encourage timely maternal care visits. Integrating maternal healthcare education with community outreach can help address knowledge gaps, particularly among highly educated women who may underestimate the importance of timely PNC checkups.

Table 1: Trends in Percentage of Pregnant Women Receiving 4 or more ANC Checkups in Uttar Pradesh: HMIS

Districts/FY	Recent trends in percentage of PW received 4 or more ANC checkups (against total PW registered)			
	2020_21	2021_22	2022_23	2023_24
Kanpur Nagar	43.35	47.38	55.81	66.03
Bareilly	57.11	52.56	59.84	67.77
Lucknow	48.73	48.03	58.40	70.68
Gautam Buddha Nagar	74.79	73.92	72.07	74.04
Kanpur Dehat	86.98	74.31	80.19	76.65
Meerut	46.62	47.49	59.98	77.57
Ayodhya	56.90	68.67	70.15	81.18
Kannauj	68.38	71.81	88.83	81.84
Banda	53.97	52.81	64.96	81.95
Bulandshahr	90.42	91.26	78.92	82.42
Hapur	80.12	84.06	85.28	83.95
Azamgarh	65.48	61.01	71.92	83.95
Ghaziabad	73.02	82.73	79.63	84.52
Chandauli	69.29	73.19	80.82	84.96
Bahraich	83.11	93.95	89.64	86.57
Basti	84.49	88.65	83.62	87.16
Farrukhabad	58.31	67.42	81.99	87.26
Mathura	81.93	117.40	104.35	87.36
Jalaun	80.88	75.10	72.61	88.32
Siddharthnagar	73.72	75.00	75.37	89.94
Gorakhpur	70.92	77.82	77.91	90.50
Mainpuri	86.90	86.42	81.52	90.53
Prayagraj	77.92	87.97	97.64	92.55
Amroha	67.44	66.62	86.97	92.96
Jaunpur	65.45	80.33	86.96	93.02
Ballia	75.63	73.22	86.69	93.41
Mahoba	89.15	90.27	92.12	93.57
Ghazipur	87.90	77.47	89.46	94.08
Mau	47.37	76.45	65.73	94.16
Firozabad	83.81	91.93	88.86	94.51
Bhadohi	76.95	90.33	89.50	94.81
Etawah	50.66	73.68	88.47	94.94
Fatehpur	73.74	69.22	90.23	94.96
Rampur	84.08	93.75	92.41	95.31
Auraiya	74.00	73.38	95.93	95.40
Budaun	63.58	77.74	89.69	95.52
Amethi	96.60	100.13	94.21	95.67
Sambhal	74.62	89.23	94.69	95.90
Ambedkar Nagar	67.12	77.82	85.53	95.97
Balrampur	87.54	96.48	95.17	96.03
Pilibhit	81.95	91.36	92.56	96.39
Mirzapur	74.97	91.55	97.71	96.55
Bara Banki	69.64	76.74	93.38	96.73
Moradabad	78.80	87.61	91.94	97.07
Kaushambi	82.63	99.71	88.43	97.34
Shrawasti	89.38	98.14	97.15	97.42
Aligarh	83.08	96.12	92.17	97.69
Gonda	79.47	93.79	98.33	98.03
Baghpat	94.21	94.14	93.85	98.06
Sant Kabir Nagar	70.38	74.00	88.77	98.12
Kushinagar	91.14	82.19	91.53	98.26
Sitapur	79.07	86.40	88.87	98.62
Sultanpur	68.79	54.64	66.91	99.11
Chitrakoot	82.95	99.92	94.92	99.64
Sonbhadra	83.18	98.35	97.76	99.80
Mahrajganj	94.14	100.36	99.32	99.96
Shamli	95.75	104.72	105.00	100.29
Saharanpur	92.42	95.41	101.06	100.32
Varanasi	71.56	85.94	81.69	100.37
Bijnor	85.17	89.01	96.47	100.45
Jhansi	76.42	76.14	85.39	100.54
Hardoi	81.53	89.03	89.60	100.71
Pratapgarh	95.92	99.80	99.30	101.32
Deoria	91.32	95.02	94.36	101.54
Kasganj	72.77	81.85	89.82	101.59
Etah	56.68	66.70	85.99	101.99
Hathras	81.66	92.33	99.12	102.08
Unnao	89.47	89.41	100.34	106.29
Muzaffarnagar	86.08	95.68	99.47	107.58
Kheri	95.34	97.30	113.39	109.76
Hamirpur	95.35	96.31	91.26	110.69
Rae Bareli	121.68	154.48	106.30	111.18
Shahjahanpur	88.55	89.36	95.62	112.26
Lalitpur	81.20	85.41	97.52	124.04
Agra	80.37	110.16	103.56	126.03
Uttar Pradesh	77.01	83.03	86.74	93.43

Table 2: Trends in the Percentage of Women Receiving Post-partum Checkups Between 48 hours and 14 Days After Delivery: HMIS

Districts/FY	Recent trends in the percentage of women receiving Postpartum checkups between 48 hours and 14 days after delivery			
	2020_21	2021_22	2022_23	2023_24

Mahoba	0.22	1.54	5.72	2.13
Hamirpur	2.07	1.08	2.03	3.31
Etah	26.39	24.80	16.90	9.77
Rampur	43.30	22.80	19.36	13.04
Gorakhpur	33.71	33.79	27.50	14.86
Moradabad	39.17	32.56	39.79	17.49
Amroha	5.05	13.50	19.67	17.85
Hathras	51.77	27.10	21.77	18.14
Siddharthnagar	45.68	49.70	34.73	18.67
Bulandshahr	133.35	41.94	37.65	19.18
Muzaffarnagar	17.41	29.73	30.10	19.38
Farrukhabad	22.86	29.93	20.94	20.33
Etawah	48.18	65.28	65.41	21.19
Kanpur Nagar	30.31	31.66	34.38	22.41
Bijnor	39.20	31.00	30.12	23.37
Kanpur Dehat	10.71	27.68	33.33	23.73
Mathura	22.75	47.00	38.65	24.67
Firozabad	59.28	49.62	52.65	27.55
Agra	86.31	26.98	29.79	28.72
Bahraich	50.40	32.94	37.23	30.27
Mainpuri	44.03	57.69	62.66	30.95
Sitapur	88.69	52.45	46.33	31.23
Unnao	95.08	49.73	53.76	31.34
Ghazipur	49.40	41.28	40.28	31.91
Chandauli	25.56	45.63	40.62	34.68
Budaun	69.55	42.41	32.07	34.89
Shahjahanpur	60.13	57.25	52.10	35.00
Kushinagar	49.62	46.26	45.59	35.41
Bareilly	36.98	33.97	36.99	36.42
Azamgarh	45.29	27.11	45.35	37.60
Ballia	30.18	40.98	42.20	37.88
Mirzapur	56.58	46.91	44.62	38.99
Ayodhya	25.38	28.21	40.52	39.17
Jaunpur	89.54	49.71	45.61	39.47
Meerut	52.43	26.53	31.98	39.56
Varanasi	0.85	55.87	50.52	40.45
Deoria	51.16	58.68	44.39	41.38
Chitrakoot	34.61	34.80	22.43	41.87
Auraiya	36.67	72.09	68.72	41.92
Rae Bareli	23.20	43.23	37.46	42.73
Jalaun	55.51	64.27	63.65	42.91
Lucknow	39.60	28.81	35.83	43.35
Sonbhadra	48.54	50.24	50.63	43.60
Shamli	38.88	59.22	47.24	44.01
Fatehpur	53.23	36.16	32.56	44.57
Hardoi	34.95	46.85	51.24	45.14
Baghpat	27.64	54.47	52.49	46.90
Kheri	81.11	57.07	59.31	49.03
Shrawasti	36.08	60.98	61.53	50.16
Sambhal	32.68	54.77	64.33	50.67
Banda	27.30	22.26	25.59	50.78
Mau	9.46	23.17	60.59	51.86
Kasganj	13.03	23.50	47.69	52.15
Aligarh	169.81	70.34	69.00	53.26
Sant Kabir Nagar	53.28	69.84	69.79	53.31
Sultanpur	37.26	30.20	26.36	53.35
Gonda	79.31	59.35	70.24	54.52
Basti	73.24	54.92	54.83	55.29
Pratapgarh	33.59	65.45	54.93	55.53
Balrampur	69.86	71.75	68.53	55.98
Kaushambi	30.06	42.04	63.24	58.12
Kannauj	56.35	63.56	82.27	63.10
Mahrajganj	184.73	87.46	83.61	69.24
Ambedkar Nagar	87.77	78.38	78.66	69.41
Bhadohi	48.56	82.57	80.69	70.03
Bara Banki	40.43	46.99	72.05	71.86
Saharanpur	210.00	83.68	90.36	77.42
Gautam Buddha Nagar	11.28	74.30	79.39	77.97
Hapur	34.83	97.23	93.06	83.99
Jhansi	68.57	58.51	71.36	84.70
Pilibhit	19.32	40.56	48.56	85.09
Lalitpur	138.29	98.34	98.17	86.89
Ghaziabad	204.35	79.67	96.67	89.02
Prayagraj	180.80	96.41	96.02	94.80
Amethi	75.70	112.47	104.61	96.98
Uttar Pradesh	48.50	48.70	50.55	43.75

Table: 3 Percentage of Women Seeking ANC Care Services by Number of ANC Visits During Pregnancy in Uttar Pradesh: NFHS-5 (2019-2021)

Number of ANC visits	Freq.	Percent
No ANC	1,370	5.39
One ANC	2,750	10.83
2nd and 3rd ANC	10,713	42.17
4 or more ANC visits	10,571	41.61
Total	25,404	100

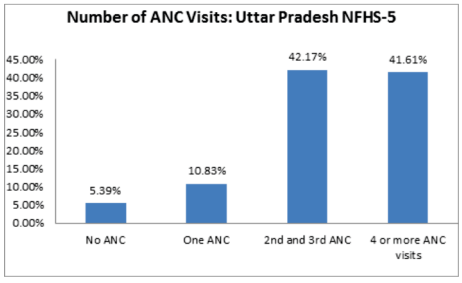

Figure: 1 Percentage of Women Seeking ANC Care Services by Number of ANC Visits During Pregnancy in Uttar Pradesh: NFHS-5 (2019-2021)

Table 4: Sample Distribution by Background Variables (ANC 4 or more Attendees) Uttar Pradesh: NFHS-5

Variables used	Freq.	Percent
Place of residence		
Rural	21,170	83.33
Urban	4,234	16.67
Caste		
SC/ST	7,097	28.03
OBC	13,894	54.88
General	4,328	17.09
Religion		
Hindus	20,997	82.65
Muslims	4,328	17.04
Others	79	0.31
Wealth Status(SES)		
Poorest/poorer	13,321	52.44
Middle	4,699	18.5
Richer/richest	7,384	29.07
Education		
Illiterate	7,351	28.94
Literate secondary	13,672	53.82
Higher	4,381	17.25
ANC Service Provider		
Doctors	11,450	45.07
Nurse/Midwife	9,000	35.43
TBA/Other/Relative	3,584	14.11
No ANC	1,370	5.39
Attended 4 or more ANC		
No	14,833	58.39
Yes	10,571	41.61
Total	25,404	100

Table 5: District-wise Percentage of Women Who Received 4 or more ANC During Pregnancy: NFHS-5

District	Women who received 4 or more ANC during pregnancy		
	Yes (%)	No (%)	Total Number

Unnao	18.94	81.06	264
Barabankki	22.62	77.38	336
Sant Ravidas Nagar	26.38	73.62	398
Mahamaya Nagar	27.20	72.80	353
Ghazipur	29.65	70.35	317
Ballia	30.11	69.89	279
Pratapgarh	30.55	69.45	311
Basti	31.73	68.27	375
Amethi	32.42	67.58	364
Chitrakoot	32.55	67.45	298
Chandauli	32.56	67.44	347
Sambhal	33.01	66.99	409
Faizabad	33.04	66.96	345
Moradabad	33.12	66.88	314
Etah	33.33	66.67	354
Mirzapur	33.85	66.15	322
Kaushambi	33.92	66.08	339
Bahraich	34.92	65.08	461
Kushinagar	35.47	64.53	358
Shahjahanpur	35.55	64.45	436
Sitapur	35.81	64.19	391
Sonbhadra	37.01	62.99	335
Jhansi	37.54	62.46	285
Fatehpur	37.65	62.35	324
Mainpuri	37.79	62.21	344
Kanshiram Nagar	38.07	61.93	373
Firozabad	38.22	61.78	348
Hardoi	38.86	61.14	368
Mathura	39.36	60.64	343
Azamgarh	39.50	60.50	319
Budaun	39.57	60.43	374
Farrukhabad	40.16	59.84	371
Banda	40.19	59.81	321
Balrampur	40.99	59.01	466
Gonda	41.27	58.73	361
Agra	41.71	58.29	362
Shamli	41.74	58.26	357
Baghpat	42.02	57.98	326
Pilibhit	42.11	57.89	266
Shrawasti	42.21	57.79	507
Bareilly	42.22	57.78	270
Deoria	42.49	57.51	313
Mau	42.56	57.44	289
Etawah	43.66	56.34	355
Jyotiba Phule Nagar	43.77	56.23	377
Allahabad	43.77	56.23	297
Hamirpur	43.93	56.07	346
Aligarh	44.10	55.90	322
Sant Kabir Nagar	44.12	55.88	374
Raebareli	44.31	55.69	325
Muzaffarnagar	44.70	55.30	302
Ambedkar Nagar	45.02	54.98	291
Sultanpur	45.97	54.03	335
Lalitpur	46.13	53.87	388
Kannauj	46.23	53.77	385
Kheri	47.27	52.73	385
Mahoba	47.52	52.48	343
Bijnor	47.65	52.35	319
Jaunpur	48.76	51.24	363
Bulandshar	48.96	51.04	337
Meerut	49.10	50.90	332
Gautam Buddha Nagar	50.23	49.77	219
Auraiya	50.42	49.58	355
Rampur	51.79	48.21	280
Saharanpur	51.88	48.12	345
Varanasi	52.36	47.64	296
Mahrajganj	52.42	47.58	351
Lucknow	52.43	47.57	206
Hapur	52.97	47.03	370
Gorakhpur	55.72	44.28	332
Ghaziabad	56.48	43.52	193
Kanpur Dehat	56.95	43.05	302
Siddharth Nagar	59.87	40.13	451
Jalaun	64.44	35.56	284
Kanpur Nagar	69.96	30.04	263
Uttar Pradesh	41.62	58.38	25416

Table 6: Logistic Regression Estimates of the Predictors of ANC4 or more Seekers in Uttar Pradesh: NFHS-5

Variable	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf. Interval]	
Place of Residence						
Rural (Ref.)	1.00					
Urban	1.22	0.05	5.08	0.00	1.13	1.31
Caste						
SC/ST (Ref.)	1.00					
OBC	1.10	0.04	3.12	0.00	1.04	1.18
Others (other than SC/ST & OBC)	1.18	0.05	3.85	0.00	1.08	1.28
Religion						
Hindu	1.00					
Muslim	0.96	0.04	-0.96	0.34	0.90	1.04
Others	0.97	0.23	-0.11	0.91	0.61	1.56
Wealth Status						
Poorest/Poorer	1.00					
Middle	1.11	0.04	2.77	0.01	1.03	1.19
Richer/Richest	1.24	0.05	5.83	0.00	1.15	1.33
Education						
Illiterate	1.00					
Literate upto secondary	1.16	0.04	4.65	0.00	1.09	1.24
Higher	1.33	0.06	6.35	0.00	1.22	1.45
ANC Service Provider						
Doctors (Ref.)	1.00					
Nurse/Midwife	0.76	0.02	-9.55	0.00	0.72	0.80
TBA/Other/Relative	0.62	0.03	-11.77	0.00	0.57	0.67
Constant	0.67	0.03	-10.59	0.00	0.62	0.72

Table 7: Sample Distribution by Background Variables (PNC with 2 Days Post Delivery) Uttar Pradesh: NFHS-5

Variables used	Freq.	Percent
Place of residence		
Rural	11,367	84.67
Urban	2,058	15.33
Caste		
SC/ST	3,876	28.98
OBC	7,333	54.82
General	2,168	16.21
Religion		
Hindus	11,061	82.39
Muslims	2,322	17.3
Others	42	0.31
Wealth Status (SES)		
Poorest/poorer	7,136	53.15
Middle	2,539	18.91
Richer/richest	3,750	27.93
Educational Attainment		
Illiterate	3,513	26.17
Literate secondary	7,599	56.6
Higher	2,313	17.23
Provider for newborn's PNC checkup		
No check	10,172	75.77
Doctor	693	5.16
Nurse/Midwife	1,241	9.24
Non-skilled provider	1,319	9.82
PNC check-up within 2 days		
No	10,172	75.77
Yes	3,253	24.23
Total	13,425	100

Kanpur Dehat	56.95	43.05	302
Siddharth Nagar	59.87	40.13	451
Jalaun	64.44	35.56	284
Kanpur Nagar	69.96	30.04	263
Uttar Pradesh	41.62	58.38	25416

Table 8: District-wise Percentage of Women Who Received Post Natal Care with 2 Days: NFHS-5

	Percentage of women seeking PNC care within first 2days post delivery	Percentage of women not seeking PNC care within first 2days post delivery	Total Number of Women in the Sample
Azamgarh	11.11	88.89	162
Faizabad	11.63	88.37	172
Gonda	12.00	88.00	175
Barabanki	12.02	87.98	183
Chandauli	12.77	87.23	188
Firozabad	12.85	87.15	179
Pratapgarh	14.19	85.81	155
Kushinagar	14.81	85.19	189
Mirzapur	15.06	84.94	166
Bareilly	15.54	84.46	148
Mathura	15.63	84.38	192
Sant Ravi Das Nagar	16.27	83.73	209
Ballia	16.79	83.21	137
Raebareli	16.88	83.13	160
Basti	17.02	82.98	188
Ghazipur	17.14	82.86	175
Sultanpur	17.16	82.84	169
Aligarh	17.54	82.46	171
Ambedkar Nagar	17.78	82.22	135
Gautam Buddha Nagar	17.82	82.18	101
Kanpur Dehat	17.90	82.10	162
Meerut	18.08	81.92	177
Sonbhadra	18.46	81.54	195
Kanpur Nagar	19.09	80.91	110
Kanshiram Nagar	19.14	80.86	209
Chitrakoot	19.23	80.77	156
Agra	20.00	80.00	200
Balrampur	20.00	80.00	270
Bahraich	20.15	79.85	263
Sambhal	20.17	79.83	238
Allahabad	20.25	79.75	163
Ghaziabad	20.39	79.61	103
Jyotiba Phule Nagar	20.48	79.52	210
Mahamaya Nagar	20.48	79.52	166
Mainpuri	20.69	79.31	174
Kheri	20.77	79.23	207
Shahjahanpur	21.03	78.97	252
Jaunpur	21.39	78.61	187
Shrawasti	21.92	78.08	292
Etawah	22.28	77.72	184
Mahrajgan	22.28	77.72	184
Varanasi	22.30	77.70	139
Etah	22.39	77.61	201
Hapur	23.23	76.77	198
Bijnor	24.28	75.72	173
Unnao	24.43	75.57	131
Baghpat	24.85	75.15	169
Sant Kabir Nagar	25.00	75.00	188
Mau	25.00	75.00	140
Moradabad	25.15	74.85	167
Siddharth	25.22	74.78	230
Deoria	25.45	74.55	165
Lalitpur	26.00	74.00	200
Pilibhit	26.09	73.91	138
Rampur	27.04	72.96	159
Farrukhabad	27.10	72.90	214
Budaun	27.54	72.46	207
Bulandshar	28.32	71.68	173
Hardoi	28.70	71.30	216
Gorakhpur	29.65	70.35	172
Lucknow	29.79	70.21	94
Saharanpur	30.11	69.89	186
Jalaun	30.67	69.33	150
Muzaffarn	31.61	68.39	155
Fatehpur	34.13	65.87	167
Shamli	37.57	62.43	189
Banda	38.31	61.69	154
Kannauj	38.43	61.57	216
Auraiya	42.29	57.71	175
Sitapur	42.34	57.66	222
Kaushambi	43.72	56.28	183
Amethi	47.06	52.94	187
Hamirpur	48.84	51.16	172
Mahoba	50.97	49.03	206
Jhansi	55.64	44.36	133
Uttar Pradesh	24.23	75.77	13,425

Table 9: Logistic Regression Estimates of the Predictors of PNC Seekers (2 Days Post Delivery) in Uttar Pradesh: NFHS-5

Variable	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf. Interval]	
Place of Residence						
Rural (Ref.)	1.00					
Urban	0.68	0.10	-2.68	0.01	0.51	0.90
Caste						
SC/ST (Ref.)	1.00					
OBC	0.68	0.10	-2.68	0.01	0.51	0.90
Others (other than SC/ST & OBC)	0.69	0.12	-2.14	0.03	0.49	0.97
Religion						
Hindu	1.00					
Muslim	1.96	0.28	4.71	0.00	1.48	2.59
Others	4.63	6.64	1.07	0.29	0.28	76.94
Wealth Status						
Poorest/Poorer	1.00					
Middle	3.76	0.68	7.32	0.00	2.64	5.36
Richer/Richest	16.80	2.74	17.27	0.00	12.20	23.13
Education						
Illiterate	1.00					
Literate upto secondary	0.72	0.11	-2.14	0.03	0.53	0.97
Higher	0.63	0.12	-2.34	0.02	0.43	0.93
PNC Service Provider						
Doctors (Ref.)	1.00					
Nurse/Midwife	0.90	0.13	-0.72	0.47	0.68	1.19
Non skilled provider	0.57	0.08	-3.77	0.00	0.43	0.77
Constant	0.07	0.01	-13.38	0.00	0.05	0.10

REFERENCES

[1]. Ahmed, S., Creanga, A. A., Gillespie, D. G., & Tsui, A. O. (2010). Economic status, education and empowerment: Implications for maternal health service utilization in developing countries. PLoS ONE, 5(6), e11190.

[2]. Agarwal, S., Sethi, V., Srivastava, K., Jha, P. K., & Baqui, A. H. (2016). Maternal health services utilization among women in urban slums of India. Journal of Urban Health, 93(6), 1010-1021.

[3]. Barros, F. C., Victora, C. G., Scherpbier, R. W., & Gwatkin, D. (2012). Inequities in the utilization of maternal and child health services in developing countries. Bulletin of the World Health Organization, 90(4), 303-311.

[4]. Bloom, S. S., Wypij, D., & Gupta, M. D. (2001). Dimensions of women's autonomy and the influence on maternal health care utilization in a North Indian city. Demography, 38(1), 67-78.

[5]. Caldwell, J. C. (1979). Education as a factor in mortality decline: An examination of Nigerian data. Population Studies, 33(3), 395-413.

[6]. Fagbamigbe, A. F., & Idemudia, E. S. (2015). Barriers to antenatal care use in Nigeria: Evidence from the 2013 demographic and health survey. BMC Pregnancy and Childbirth, 15(1), 1-14.

[7]. Kruk, M. E., Galea, S., Prescott, M., & Freedman, L. P. (2010). Health care financing and utilization of maternal health services in developing countries. Health Policy and Planning, 25(5), 369-377.

[8]. Montagu, D., Yamey, G., Visconti, A., Harding, A., & Yoong, J. (2011). Where do poor women in developing countries give birth? A multi-country analysis of demographic and health survey data. PLoS ONE, 6(2), e17155.

[9]. Rai, R. K., Singh, P. K., & Kumar, C. (2012). Equity in maternal, newborn, and child health care coverage in India. Global Health Action, 5(1), 10319.

[10]. Singh, P. K., Rai, R. K., & Kumar, C. (2012). Factors associated with maternal healthcare service utilization in India: A regional analysis. PLoS ONE, 7(11), e47882.

[11]. Subramanian, S.V. & Ackerson, Leland & Subramanyam, Malavika & Sivaramakrishnan, K.. (2008). Health inequalities in India: The axes of stratification. Brown J World Aff. 14. 127-138.

[12]. Tripathy, P., Nair, N., Barnett, S., Mahapatra, R., Borghi, J., Rath, S., & Prost, A. (2010). Effect of a participatory intervention with women's groups on birth outcomes in Jharkhand and Orissa, India: A cluster-randomised controlled trial. The Lancet, 375(9721), 1182-1192.

[13]. Titaley, C & Roberts, C. (2009). Factors Associated with non-utilisation of postnatal care services in Indonesia. Journal of epidemiology and community health. 63. 827-31. 10.1136/jech.2008.081604.
[14]. WHO Recommendations on Antenatal Care for a Positive Pregnancy Experience. Geneva: World Health Organization; 2016. 1, Introduction. Available from: https://www.ncbi.nlm.nih.gov/books/NBK409110/